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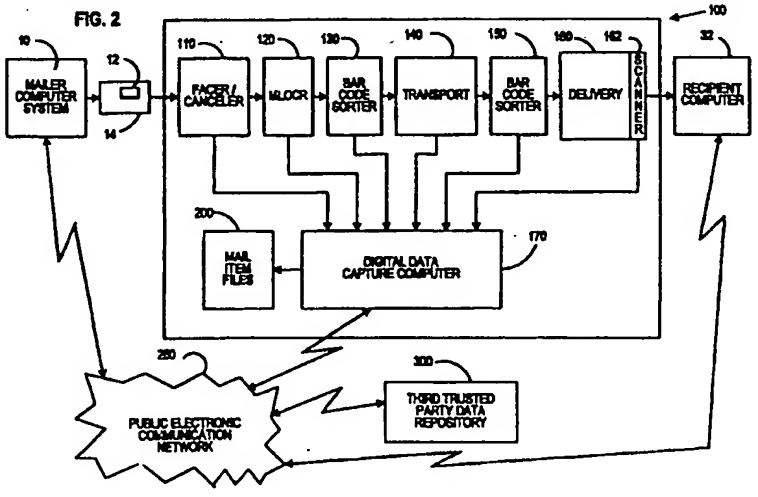
(54) System and method for automatic notification of upcoming delivery of a mail item

(57) In accordance with the present invention, when a mailer generates a mail piece, for example using mail generation software in a PC metering system, the mail generation software accesses a database of mailing addresses. This database also contains e-mail address of recipients in the mailing list (address database). If a mailer wants to send advance notice to a recipient that a mailpiece has been sent to the recipient, the mailer can choose this option automatically and use a unique mailpiece ID as an identifier of the upcoming mailpiece. (The mailpiece ID can be generated specially for this purpose and serve as a reference point for the mailer and the recipient). This can be particularly advantageous in a legal environment, when there is a need for timely distribution of information as well as the need for distribution of legally valid hard copy documents. The unique ID number may be printed in plain text in the address block and cryptographically encoded within the DPM. This ID number can be used to provide references and links to other relevant documents as well. When the DPM is scanned upon induction into a postal distribution network, system includes recognition of the recipient's e-mail address and automatically sends notice of intended delivery to the recipient. The notice may also include an estimated date of delivery.

FIG. 2



EP 1 063 602 A1

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Description

[0001] This application is related to co-pending US Patent Application Serial Number 09/339,768, filed concurrently herewith and commonly assigned to the assignee of this application.

[0002] The present invention relates generally to mailing systems and methods. More particularly, the present invention is directed to mailing systems and methods that evidence postage payment using digital postage marks.

[0003] The field of communication is one of the fastest growing sectors of the economy. Communication enables business and economic transactions and fuels global economy. Two basic modes of communication are electronic and hardcopy communications. Well known examples of electronic communication are e-mail (Internet), computer facsimile and digital telephony, while a classic example of hardcopy communication is traditional mail delivery. There are also mixed forms of communication combining hardcopy and electronic modes such as traditional facsimile and hybrid mail. Both electronic and hardcopy communications offers advantages and disadvantages to users. The electronic communications while fast and economical lack universal coverage of traditional mail and create multiple security and legal concerns, particularly in sensitive transaction-type communications. The hardcopy mail is slower and more expensive, but covers a vast majority of the population and offers legal proof that is frequently required in business and social endeavors.

[0004] Recently, in the United States of America and other countries new digital methods of payment evidencing for traditional mail has been approved by respective Posts. Specifically, Digital Postage Marks (DPM) (a.k.a. digital indicia, a.k.a. information based indicia) are computerized information printed or otherwise attached to a mail item to provide an evidence of payment to a verification authority (e.g. the United States Postal Service). See for example, PERFORMANCE CRITERIA FOR INFORMATION-BASED INDICIA AND SECURITY ARCHITECTURE FOR OPEN IBI POSTAGE METERING SYSTEMS, dated April 26, 1999, which is an United States Postal Service specification that defines the requirements for a system which uses a general purpose computer for printing information-based indicia in a 2-Dimensional barcode. When the majority of the information in the DPM is presented in the form of a 2-Dimensional barcode (such as DataMatrix or PDF417), the DPM can carry a very substantial amount of information that can be automatically and economically computerized, printed and later scanned using conventional computer-driven scanners. The nature of this information has been application dependent and has typically been oriented toward security features for verification of payment evidence. This type of information, generally referred to as postal data, preferably includes identification of the metering device (or licensee) responsible for the payment, unique identification of mail item, value of various accounting registers, location of the mail deposit/mailer's account, postage value and other similar information. Such information is typically protected by a cryptographically generated validation code known as CPVC (Cryptographic Postage Validation Code). Another way to protect DPM is by supplying the verification authority with the value of the validation code (Postage validation Code or PVC) prior to mail submission as described in US Patent 5,612,889, assigned to the assignee of this application.

[0005] As of 1998, almost 20% of the population in USA and industrial world in general have access to electronic mail via Internet. Even a higher number of mailers use facsimile regularly. These numbers are expected to grow dramatically in the future. Although such electronic communications provide speed and efficiency over the physical delivery of mail, there is no indication that such electronic communications will replace the physical delivery of mail. Heretofore, such electronic communications have been an alternative form of communication to the physical delivery of mail. The present invention provides an effective communication system that links the physical delivery of mail with electronic communications to optimize communications utilization of the advantages of each.

[0006] In accordance with the present invention, the machine-readable DPM provides means that allow mailers evidencing postage payment with a DPM to notify automatically recipients of their regular mail about upcoming delivery of their mail using e-mail. It has been found that the digital data in the DPM may include information that can be used for other than security and postage payment verification. For example, by including a mailer's e-mail address in the DPM, the present invention provides an opportunity to send a e-mail return receipt, which eliminates the need for a return receipt being physically delivered to the mailer. Thus, the postal service saves on the mail cost by adding this attribute to the DPM and the savings can be passed along to the mailer.

[0007] The present invention realizes that the new digital methods of payment evidencing offer unprecedented opportunities not only to improve postal revenue collection and protection but also to create new user friendly services that can greatly improve the appeal of traditional mail. Transition to digital methods of payment evidencing in fact offers an information-rich interface between mailers, posts and mail recipients that can substantially amplify advantages and features of traditional mail while simultaneously alleviating its disadvantages, such as its relatively high cost. Paradoxically, this information-rich interface can be achieved by integrating traditional hardcopy and electronic communication into one effective communication system that takes advantage of beneficial features of both media and offering end users (i.e. rate paying public) a broad selection of communication choices.

[0008] In accordance with the present invention, the DPM is treated as a message that is sent by a mailer to a service provider (carrier or Post), mail item recipient and any third party interested in the information encoded in the DPM (such as for example, a legal authority). In this regard, the DPM message can support any specific application of communication.

[0009] The present invention provides for the integration of electronic communication information, such as an e-mail address or a telephone, facsimile or pager number, into a conventional DPM. This allows the automatic creation and forwarding of service messages (such as delivery confirmation) to the mailer (or other intended recipient of the electronic communication) in a more expeditious and effective manner. Essentially, any information about a mail item known to the carrier can be forwarded to the mailer (or other intended recipient) through an alternative electronic communication channel. This concept can be extended even to the mail item communication message, which is unlike DPM is hidden from the carrier. In particular, a digest of mail item communication message (e.g. hash value) can be included into DPM as an evidence of the nature of delivered message. Through use of well-known security techniques, such as cryptography, the present invention deals effectively with issues of confidentiality, message integrity, authentication and non-repudiation. These and other aspects of the present invention are covered in the detailed description of the invention.

[0010] In accordance with the present invention, when a mailer generates a mail piece, for example using mail generation software in a PC metering system, the mail generation software accesses a database of mailing addresses. This database also contains e-mail address of recipients in the mailing list (address database). If a mailer wants to send advance notice to a recipient that a mailpiece has been sent to the recipient, the mailer can choose this option automatically and use a unique mailpiece ID as an identifier of the upcoming mailpiece. (The mailpiece ID can be generated specially for this purpose and serve as a reference point for the mailer and the recipient). This can be particularly advantageous in a legal environment, when there is a need for timely distribution of information as well as the need for distribution of legally valid hard copy documents. The unique ID number may be printed in plain text in the address block and cryptographically encoded within the DPM. This ID number can be used to provide references and links to other relevant documents as well. When the DPM is scanned upon induction into a postal distribution network, system includes recognition of the recipient's e-mail address and automatically sends notice of intended delivery to the recipient. The notice may also include an estimated date of delivery.

[0011] In accordance with the present invention, system and method for providing notification relating to the upcoming delivery of a mailpiece within a mailing system includes a determination of postal data required for postage evidencing of a mailpiece originated by a mailer. The postal data is combined with electronic addressing information needed for sending an electronic notification to an intended recipient of the mailpiece. A digital postmark comprising the postal data and the electronic addressing information is then created. The digital postmark is read when the mailpiece is inducted into a postal distribution system and an electronic message is sent to the recipient in accordance with the electronic addressing information to alert the recipient of the upcoming delivery of the mailpiece.

[0012] Therefore, it is now apparent that the present invention substantially overcomes the disadvantages associated with the prior art. Additional advantages of the invention will be set forth in the description, which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

[0013] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate presently preferred embodiments of the invention, and together with the general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention. As shown throughout the drawings, like reference numerals designate like or corresponding parts.

Fig. 1 is a schematic of a prior art PC metering system as an example of a mail generation subsystem that creates and prints a DPM in accordance with the present invention;

Fig. 2 is a block diagram of a postal distribution network in accordance with the present invention;

Fig. 3 is a block representation of a mail item file that is created and supplemented as the mail item is processed and delivered in accordance with the present invention;

Fig. 4 is a flow chart of the process of creating the mail item to be processed by the postal distribution network of Fig. 2; and

Fig. 5 is a flow chart of the process of notifying the recipient of upcoming delivery of a mail item by the postal distribution network of Fig. 2.

[0014] The present invention provides a system and method for integrating value-added services information into the DPM of a mail item to provide a more economical and efficient method of providing such value-added services. Although the present invention is described below as an e-mail implementation, it will be understood by those skilled in the art that a viable alternative includes substituting a recipient's pager number so that a pager notification of upcoming mail delivery can be sent. Other viable alternatives include facsimile or auto-

mated voice response notification. Furthermore, the present invention is described for a mail item that is delivered by a postal service. It will be understood by those skilled in the art that the present invention can be used with any carrier that physically delivers any item. It will be further understood that for such other carriers, the communication information that is described herein as being integrated in the DPM, may be applied in any manner to any part of the item being physically delivered. For example, the information may be part of a bar code or may be in plain text.

[0015] Referring now to Fig. 1, a schematic of a prior art PC metering system, generally designated 10, is shown as an example of a mail generation system that creates and prints a DPM 12 on mail item 14 in accordance with the present invention. In accordance with the present invention, DPM 12 includes a 2-Dimensional bar code that contains conventional IBIP information and recipient notification information, such as e-mail address, facsimile number, telephone number and/or pager number, and a mail item unique identification number. PC meter 10 includes conventional PC 16, display 18 and printer 20. See U.S. Patent No. 5,781,438, assigned to the assignee of this application, for a more detailed description of a PC metering system.

[0016] Referring now to Fig. 2, a block diagram of the system of the present invention is shown. The system includes a postal distribution network, generally designated 100, which processes a mail item 14 that originated from mailer's PC computer system 10 and delivers mail item 14 to a recipient 30 while capturing value-added services information in accordance with the present invention. The postal distribution network 100 includes conventional components such as: facer/canceler 110; MLOCR (multi-line optical character reader) sorters 120 that typically perform a primary sort for mail items that have not been presorted; intermediate bar-code sorters 130, postal transport means 140 for transporting the mail item from one postal facility to another; final bar code sorters 150; and delivery means 160, such as a mail carrier delivery to a mailbox. Delivery means 160 includes a scanner 162 for scanning DPM 12 at the time of delivery. In accordance with the present invention, postal distribution network 100 further includes a digital data capture computer 170 that is optionally coupled to one or more of the aforementioned components of the postal distribution network 100 for the purpose of capturing information, including value-added services information such as notification to recipient of upcoming delivery, that is read from the DPM of the mail item being processed. As information is captured by digital data capture computer 170, a mail item file 200 (described in detail below) is created. Depending on the value-added services being processed, digital data capture computer 170 communicates through a public electronic communications network 250 with mailer's computer system 10, recipient's computer 32 or a third party computer 300. Communications network 250 may be any conventional communications network, such as the Internet or a cellular/conventional telephonic network, or any combination thereof depending on the type of communication information read from the DPM.

[0017] Referring now to Fig. 3, a block representation of mail item file 200 that is created and supplemented as mail item 14 is processed and delivered to recipient 30. Mail item file 200 includes: a header 305 of postal information that has been captured from an initial read of the DPM; a mail item identification number 310, which has been read from the DPM or assigned within the postal distribution network 100; a list 318 of value-added services requested; and one or more e-mail addresses 320. For example, the value-added services may direct a communication to the mailer, the recipient, a third party repository or any other party. The present invention provides for one or more of such communications. Mail item file 200 further includes various data elements 320 that are optionally captured depending on the value-added services requested. Data elements 320 may include induction time 330 and induction address 332 indicating when and where mail item 14 enters the postal distribution network 100, intermediate times 340 and addresses 342 indicating various stages of processing within the postal distribution network 100, and delivery time 350 and delivery address 352 indicating when and where the mail item leaves the postal distribution network 100. Data elements 320 may further include information captured when the DPM 12 was read, such as a hash 360 of the contents of mail item 14 and a digital signature and/or certificate 370.

[0018] Referring now to Fig. 4, a process is shown for creating mail item 14 to be processed by the postal distribution network 100 in accordance with the present invention. Mail item 14 is created with a DPM mark that includes the mailer's e-mail address that will be used, for example, as confirmation or completion of value-added services requested by the mailer. Additional e-mail addresses may be included for other parties that the mailer desires to receive notice of, for example, delivery. DPM generation and/or postage payment process involves a user-selectable option to include e-mail address in encrypted form within the DPM. At step 400, using mail creation software in PC 16, a mailer enters or selects delivery address information, return address information and payment information. At step 405, the mailer selects desired value-added services, rating information and confirmation notification information, such as e-mail address, facsimile number, telephone number and/or pager number. It will be understood that the e-mail address may be automatically retrieved when the value-added services are selected. It will also be understood that the fee associated with the selected value-added services will be accounted for accordingly. At step 410, a cryptographic postage validation code (CPVC) is computed, for example, using digital signa-

ture with appendix, or digital signature with message recovery, a hybrid digital signature or message authentication code or postage validation code. At step 415, DPM 12 (including meter ID, mail item ID, origination postal code, service indicator, rating parameters, delivery address identifier date, postage value and CPVC) is formatted for printing in OCR/human readable format and 2-D bar code. At step 4207 mail item 14 is printed by printer 20 with DPM 12. At step 425, mail item 14 is deposited into the postal distribution network 100.

[0019] Referring now to Fig. 5, a flow chart of the processing of mail item 14 by postal distribution network 100. At step 500, the processing of mail item 14 begins with the scanning of DPM 12, which provides delivery information and value-added services information including recipient's e-mail address. At step 505, a verification key is obtained from DPM 12 or an external database and the CPVC is verified using digital signature with appendix, or digital signature with message recovery, a hybrid digital signature or message authentication code or postage validation code. At step 510, if the CPVC is not correct, then at step 590 mail item 14 is outsorted. If the CPVC is correct, then a check is made at step 515 to determine whether notice to recipient has been requested. If not, then normal processing continues at step 580. If requested, then at step 520, notification is sent to the recipient using the e-mail address read from DPM 12. At step 525, mail item 14 is marked, if requested, for special handling by the delivery mailman and mail item 14 is sorted and transported for final sort and delivery. At step 530, the mail item is delivered according to special handling instructions if any.

[0020] In accordance with the present invention, when a mailer generates a mail piece, for example using mail generation software in a PC metering system, the mail generation software accesses a database of mailing addresses. This database also contains e-mail address of recipients in the mailing list (address database). If a mailer wants to send advance notice to a recipient that a mailpiece has been sent to the recipient, the mailer can choose this option automatically and use a unique mailpiece ID as an identifier of the upcoming mailpiece. (The mailpiece ID can be generated specially for this purpose and serve as a reference point for the mailer and the recipient). This can be particularly advantageous in a legal environment, when there is a need for timely distribution of information as well as the need for distribution of legally valid hard copy documents. The unique ID number may be printed in plain text in the address block and cryptographically encoded within the DPM. This ID number can be used to provide references and links to other relevant documents as well. When the DPM is scanned upon induction into a postal distribution network, system includes recognition of the recipient's e-mail address and automatically sends notice of intended delivery to the recipient The notice may also include an estimated date of delivery.

[0021] Many features of the embodiments disclosed herein represent design choices selected to exploit the inventive concept as implemented in a particular mailing system environment. However, those skilled in the art will recognize that various modifications can be made without departing from the spirit of the present invention. Therefore, the inventive concept in its broader aspects is not limited to the specific details of the preferred embodiments described above, but is defined by the appended claims and their equivalents.

Claims

1. A method for providing notification relating to the upcoming delivery of a mailpiece within a mailing system, the method comprising:

   determining postal data required for postage evidencing of a mailpiece originated by a mailer;
   combining the postal data with electronic addressing information for sending an electronic notification to an intended recipient of the mailpiece;
   creating a digital postmark comprising the postal data and the electronic addressing information;
   reading the digital postmark when the mailpiece is inducted into a postal distribution system;
   sending an electronic message to the recipient in accordance with the electronic addressing information.

2. The method of claim 1 wherein the electronic addressing information is recipient's e-mail address.

3. The method of claim 1 wherein the electronic information includes an estimated time of delivery.

4. A method for providing notification relating to the upcoming delivery of a mailpiece within a mailing system, the method comprising the steps of:

   a) creating a set of data in response to a request for sending an electronic message to a mailpiece recipient said data including a recipient electronic address;
   c) printing said data on a mailpiece;
   d) reading said data to determine said recipient electronic address; and
   e) sending said electronic message to the recipient in accordance with the electronic addressing data.

5. The method as claimed in claim 4 wherein said electronic message is an estimated time of delivery.

6. A method for providing notification relating to the upcoming delivery of a mailpiece within a mailing system, the method comprising the steps of:

    a) determining a set of postal data required of postage payment evidencing of a mailpiece;
    b) determining an electronic address of a recipient of said mailpiece;
    c) creating a digital postmark including said set of postal data and said electronic address of said recipient;
    d) encrypting said digital postmark;
    e) printing said digital postmark on said mailpiece
    f) processing said mailpiece, said processing including;

        1) scanning said mailpiece to obtain said digital postmark;
        2) decrypting said digital postmark;
        3) determining mailpiece validity by verifying said digital postmark;
        4) determining said recipient address; and
        5) sending an electronic message to said electronic address of said recipient.

7. A system for providing notification relating to the upcoming delivery of a mailpiece within a mailing system comprising:

    a) means for scanning a predetermined location on a mailpiece to determine an electronic address for the mailpiece recipient, said electronic address being incorporated into said predetermined location on a mailpiece, and
    c) means for sending an electronic message to a recipient based on said electronic address.

8. The method as claimed in claim 4 or 6 or 7 wherein said electronic address is an e-mail address.

9. The method as claimed in claim 4 or 6 wherein said electronic address is a telephone number.

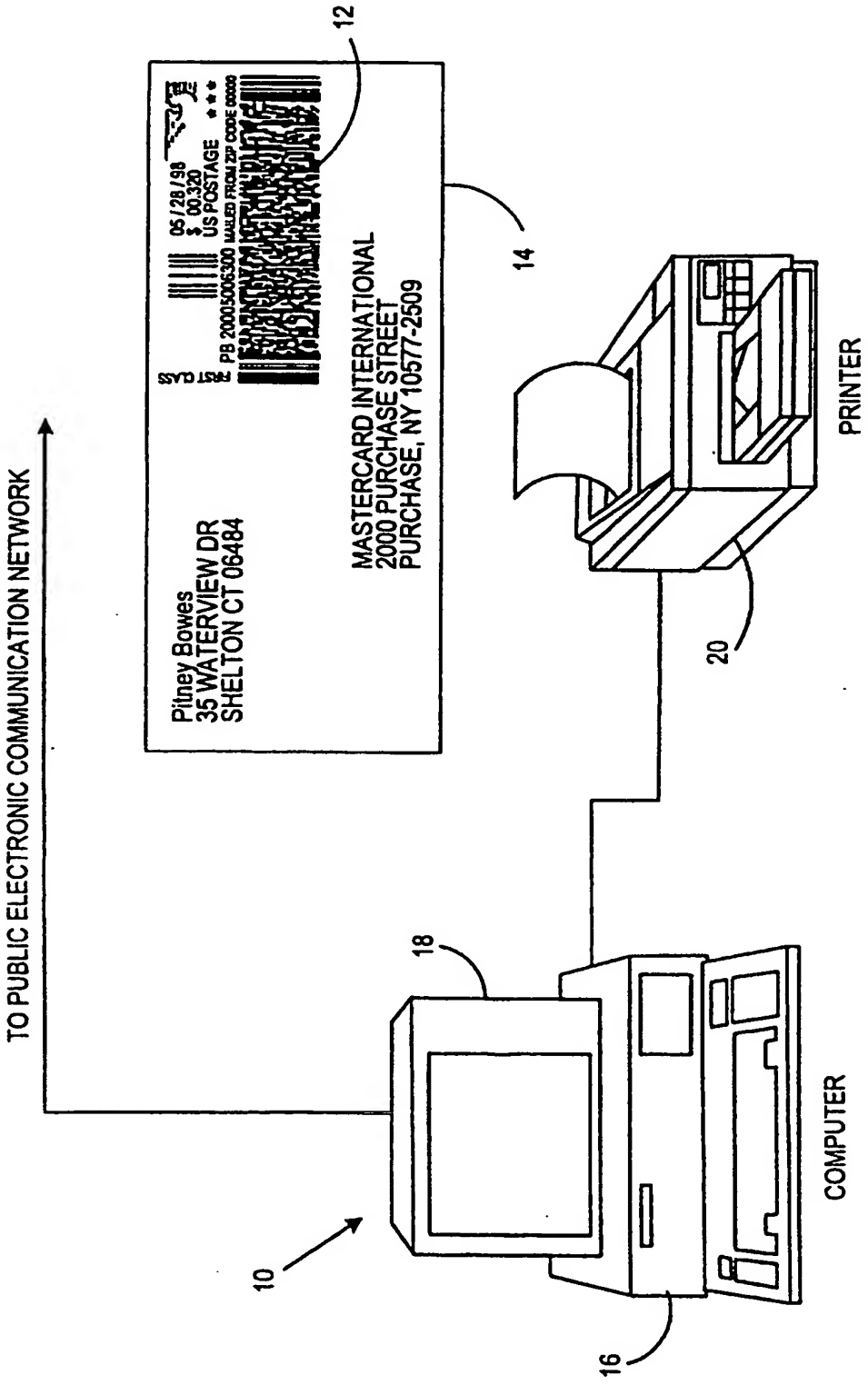
10. The method as claimed in claim 4 or 6 wherein said electronic address is a pager number.

11. The method as claimed in claim 4 or 6 or 7 wherein said electronic address is a facsimile number.

12. The method as claimed in claim 6 or 7 wherein said electronic message indicates the estimated time of delivery of said mailpiece.

13. The system as claimed in claim 7 wherein said means for scanning is optical character recognition.

FIG. 1


TO PUBLIC ELECTRONIC COMMUNICATION NETWORK
Pitney Bowes
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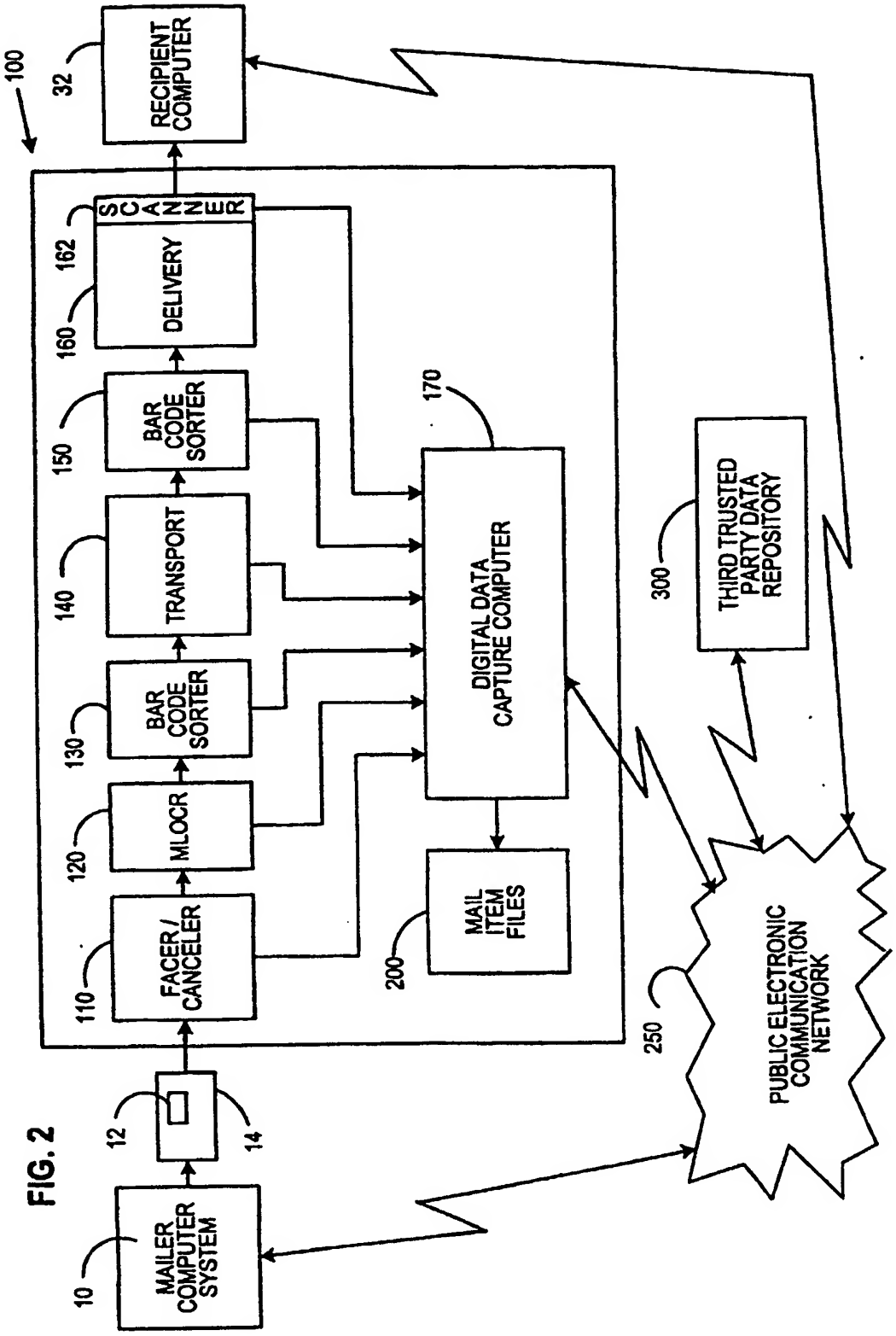

100
RECIPIENT COMPUTER
32
SCANNER
DELIVERY
162
160
BAR CODE SORTER
150
TRANSPORT
140
BAR CODE SORTER
130
MLOCR
120
FACER / CANCELER
110
DIGITAL DATA CAPTURE COMPUTER
170
MAIL ITEM FILES
200
THIRD TRUSTED PARTY DATA REPOSITORY
300
PUBLIC ELECTRONIC COMMUNICATION NETWORK
250
12
14
MAILER COMPUTER SYSTEM
10

FIG. 2

FIG. 3

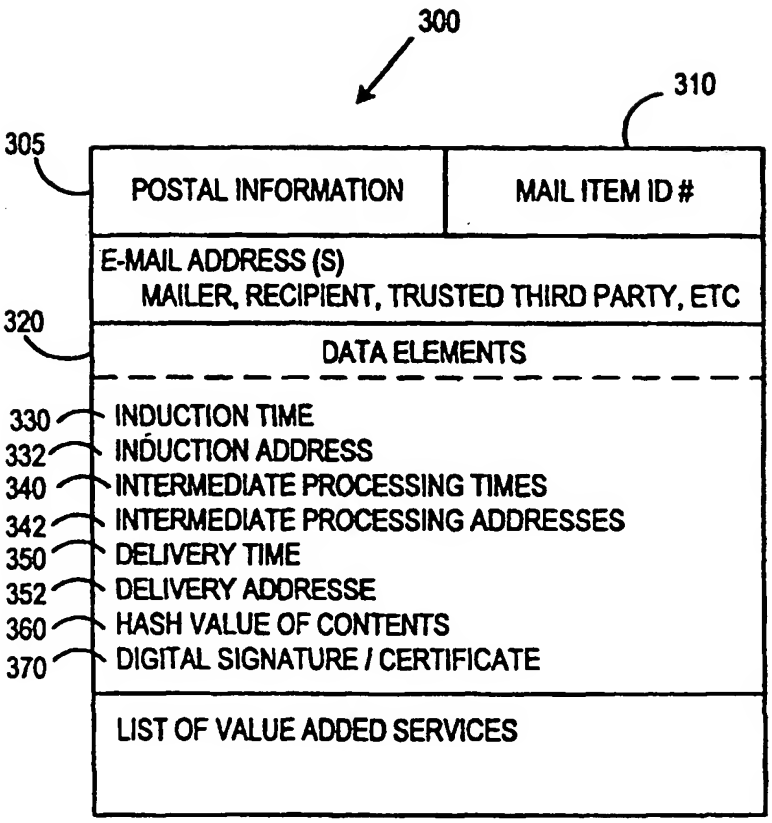

300
310
305
POSTAL INFORMATION
MAIL ITEM ID #
E-MAIL ADDRESS (S)
MAILER, RECIPIENT, TRUSTED THIRD PARTY, ETC
320
DATA ELEMENTS
330 INDUCTION TIME
332 INDUCTION ADDRESS
340 INTERMEDIATE PROCESSING TIMES
342 INTERMEDIATE PROCESSING ADDRESSES
350 DELIVERY TIME
352 DELIVERY ADDRESSE
360 HASH VALUE OF CONTENTS
370 DIGITAL SIGNATURE / CERTIFICATE
LIST OF VALUE ADDED SERVICES

FIG. 4

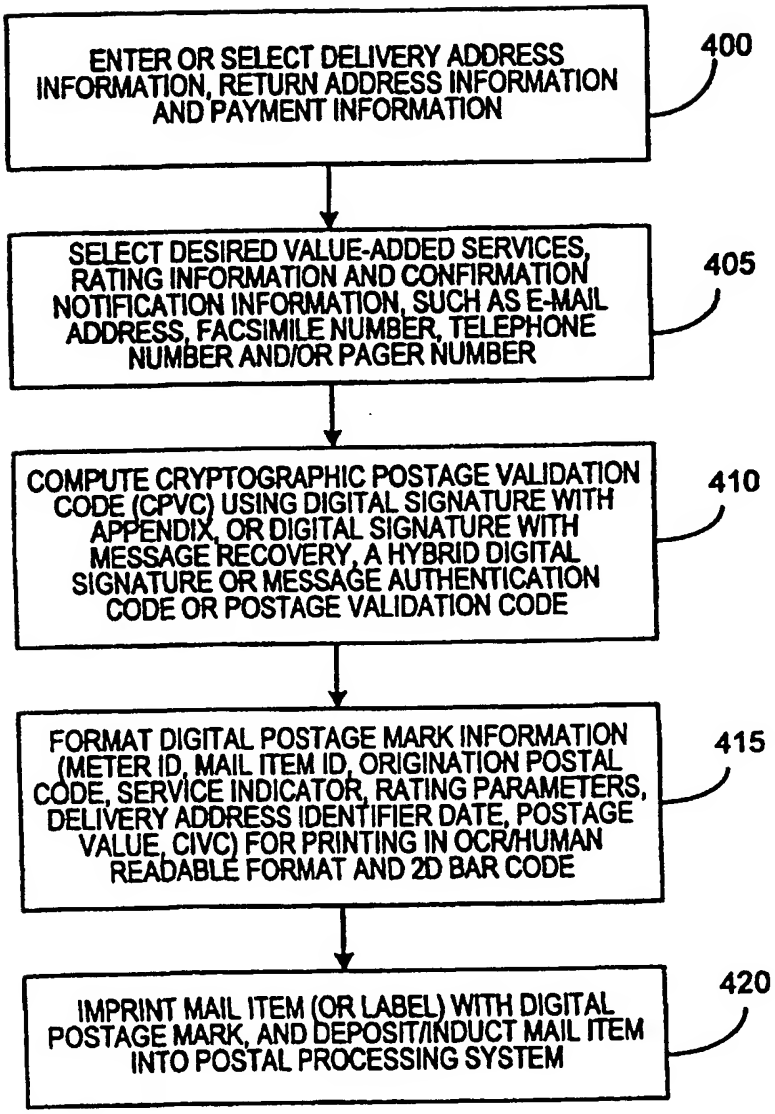
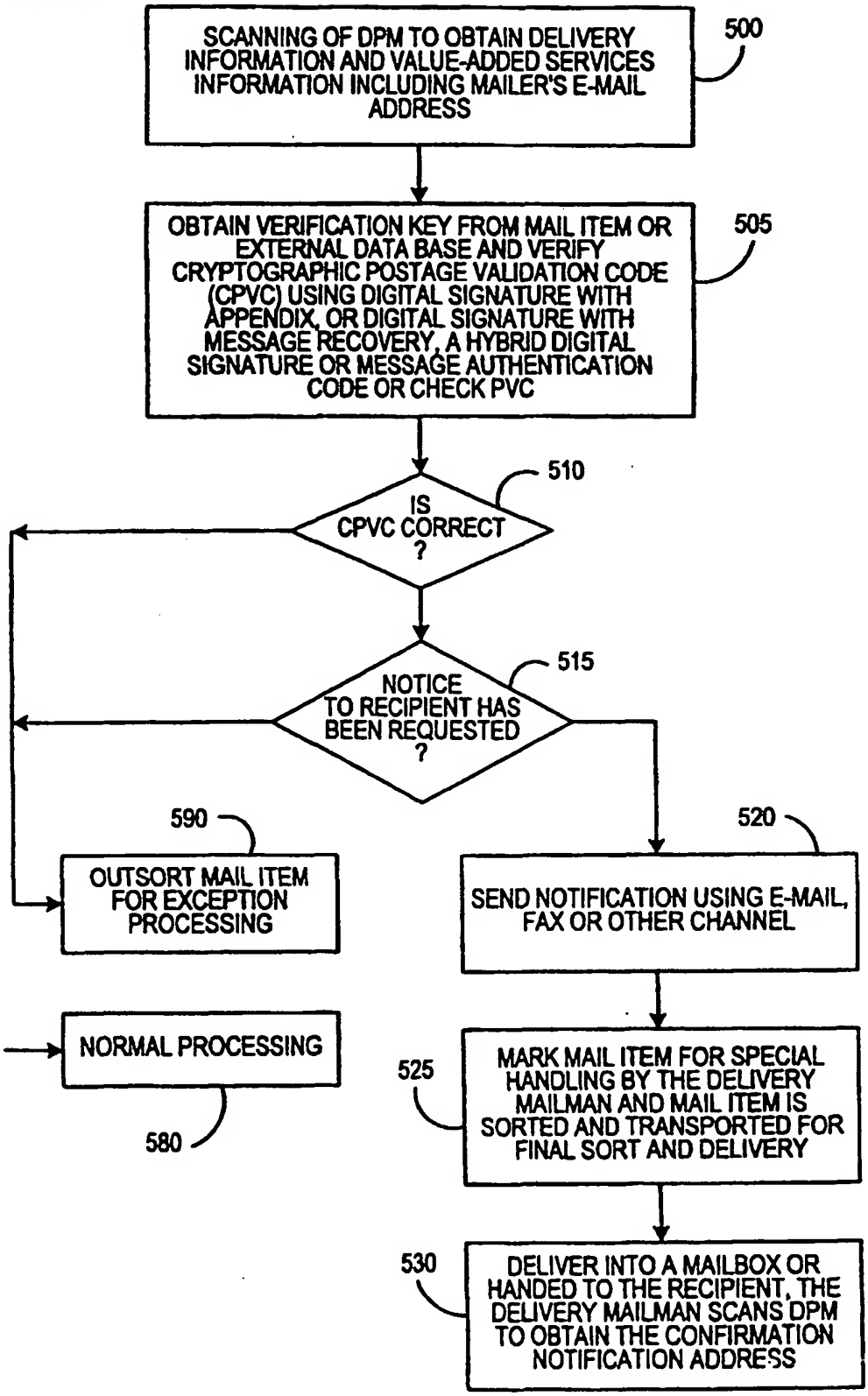

ENTER OR SELECT DELIVERY ADDRESS INFORMATION, RETURN ADDRESS INFORMATION AND PAYMENT INFORMATION
400
SELECT DESIRED VALUE-ADDED SERVICES, RATING INFORMATION AND CONFIRMATION NOTIFICATION INFORMATION, SUCH AS E-MAIL ADDRESS, FACSIMILE NUMBER, TELEPHONE NUMBER AND/OR PAGER NUMBER
405
COMPUTE CRYPTOGRAPHIC POSTAGE VALIDATION CODE (CPVC) USING DIGITAL SIGNATURE WITH APPENDIX, OR DIGITAL SIGNATURE WITH MESSAGE RECOVERY, A HYBRID DIGITAL SIGNATURE OR MESSAGE AUTHENTICATION CODE OR POSTAGE VALIDATION CODE
410
FORMAT DIGITAL POSTAGE MARK INFORMATION (METER ID, MAIL ITEM ID, ORIGINATION POSTAL CODE, SERVICE INDICATOR, RATING PARAMETERS, DELIVERY ADDRESS IDENTIFIER DATE, POSTAGE VALUE, CIVC) FOR PRINTING IN OCR/HUMAN READABLE FORMAT AND 2D BAR CODE
415
IMPRINT MAIL ITEM (OR LABEL) WITH DIGITAL POSTAGE MARK, AND DEPOSIT/INDUCT MAIL ITEM INTO POSTAL PROCESSING SYSTEM
420

FIG. 5


SCANNING OF DPM TO OBTAIN DELIVERY INFORMATION AND VALUE-ADDED SERVICES INFORMATION INCLUDING MAILER'S E-MAIL ADDRESS
500
OBTAIN VERIFICATION KEY FROM MAIL ITEM OR EXTERNAL DATA BASE AND VERIFY CRYPTOGRAPHIC POSTAGE VALIDATION CODE (CPVC) USING DIGITAL SIGNATURE WITH APPENDIX, OR DIGITAL SIGNATURE WITH MESSAGE RECOVERY, A HYBRID DIGITAL SIGNATURE OR MESSAGE AUTHENTICATION CODE OR CHECK PVC
505
IS CPVC CORRECT ?
510
NOTICE TO RECIPIENT HAS BEEN REQUESTED ?
515
590
OUTSORT MAIL ITEM FOR EXCEPTION PROCESSING
520
SEND NOTIFICATION USING E-MAIL, FAX OR OTHER CHANNEL
NORMAL PROCESSING
580
525
MARK MAIL ITEM FOR SPECIAL HANDLING BY THE DELIVERY MAILMAN AND MAIL ITEM IS SORTED AND TRANSPORTED FOR FINAL SORT AND DELIVERY
530
DELIVER INTO A MAILBOX OR HANDED TO THE RECIPIENT, THE DELIVERY MAILMAN SCANS DPM TO OBTAIN THE CONFIRMATION NOTIFICATION ADDRESS

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 3053

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 826 034 A (ALBAL NANDAKISHORE A) 20 October 1998 (1998-10-20) * claim 1; figure 1 *	1-13	G07B17/00
A	WO 99 21330 A (E STAMP CORP) 29 April 1999 (1999-04-29) * claim 1; figure 1 *	1-13	
A	US 5 805 810 A (MAXWELL ROBERT L) 8 September 1998 (1998-09-08) * claim 1; figure 2 *	1-13	
A	US 4 106 060 A (CHAPMAN JR HERBERT HILL) 8 August 1978 (1978-08-08) * claim 1; figure 1 *	1-13	
A	US 5 918 220 A (LEVITSKY PAUL A ET AL) 29 June 1999 (1999-06-29) * claim 1; figure 1 *	1-13	
A,D	US 5 612 889 A (PINTSOV LEON A ET AL) 18 March 1997 (1997-03-18) * claim 1; figure 1 *	1-13	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G07B
A	US 5 648 916 A (MANDULEY FLAVIO M) 15 July 1997 (1997-07-15) * claim 1; figure 1 *	1-13	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	8 November 2000	Kirsten, K

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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08-11-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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